WHAT IS CLAIMED IS:

1. An apparatus to measure a heart rate variability (HRV), comprising:

a listening instrument to collect sound signals of a heart, wherein high frequency sounds and low frequency vibrations are transformed into electrical signals; and

a computing system to analyze the electrical signals of the sound signals of the heart, wherein frequency-domain parameters of the electrical signals are quantified to characterize the heart rate variability.

2. The apparatus of claim 1, wherein the listening instrument includes a microphone.

3. The apparatus of claim 1, wherein the listening instrument includes an instrument used in auscultation.

4. The apparatus of claim 1, wherein the apparatus further comprises an amplifier, a filter and an analog-to-digital converter to process the electrical signals before the electrical signals are analyzed by the computing system.

5. The apparatus of claim 1, wherein the computing system includes a personal computer, a personal digital assistant or a microchip.

6. The apparatus of claim 1, wherein the computing system comprises a digital signal processing unit to estimate an beat-to-beat interval of a heart beat.

7. The apparatus of claim 1, wherein the digital signal processing unit performs frequency-domain analysis, time-domain analysis and non-liner analysis to analyze the heart rate variability of the heart.

8. The apparatus of claim 6, wherein the frequency-domain parameters include high frequency (HF), low frequency (LF), total power (TP) and HF/LF.

9. A method to monitor an autonomic nervous system, comprising:

collecting sound signals of a heart resulted from contractions of the heart;

digitizing the sound signals;

estimating beat-to-beat interval values based on the digitized sound signals;

transforming the interval values into a frequency spectrum; and

quantifying components of a frequency distribution of a heart rate variability.

10. The method of claim 9, wherein the sound signals of the heart is collected by placing a microphone or a listening instrument used in auscultation near the heart of a subject.

11. The method of claim 9, wherein an interval between two peaks of a current spike and a latter spike of the digitized sound signals is estimated as the beat-to-beat value.

12. The method of claim 9, wherein estimating the beat-to-beat interval values based on the digitized sound signals further comprises:

measuring amplitudes and duration of all spikes of the digitized sound signals;

calculating means and standard deviations of the measured amplitudes and the measured duration of the spikes as standard templates;

comparing the amplitude and the duration of each spike of the digitized sound signal with the standard templates; and

rejecting the spike of the digitized sound signal if the amplitude and the duration of the spike exceeds three times of those of the standard templates.

13. The method of claim 9, wherein estimating beat-to-beat interval values, transforming the interval values into a frequency spectrum and analyzing the frequency spectrum are performed with a computer.

14. The method of claim 13, wherein the computer includes a portable computer, a personal digital assistant or a microchip.

15. The method of claim 9, wherein the components of the frequency distribution of the heart rate variability include low frequency (LF), high frequency (HF), total power (TP) and LF/HF.

16. The method of claim 9, wherein after collecting the sound signals of the heart the sound signals are amplified and filtered.